AEROSPACE RESEARCH APPLICATIONS CENTER

Quarterly Report - Special Projects Contract - No. NSG 15-003-032

October 1, 1966 - December 31, 1966

Introduction

During this quarter, the fall meeting for ARAC member companies and prospective member companies was held in conjunction with the Indiana Executive Program's fall meeting. A total of 250 People were in attendance at the meeting representing some 98 industries, universities, and other organizations. In spite of the freak snow storm at the time of the meeting, a total of 51 member companies and prospective member companies were included in attendance at the meeting. This quarter also witnessed the long-awaited successful functioning of the NASA-Recon experiment with the Bunker Ramo equipment. Summaries of the progress in this and other special projects are listed below.

University Program

During the fourth quarter, seven different universities participated in the Center's experimental program aimed at assisting academic scientists and graduate students with their technical needs. The breakdown of activity with the universities is indicated in Appendix A of this report. In addition to the activity shown in Appendix A, three Standard Interest Profiles (SIP) are now being disseminated to locations on the Indiana University campus.

Although gaining acceptance in the academic community has proven to be a formidable task, an effort is underway to evaluate the transfer mechanisms presently being employed with academicians. The approaches appear to fall into four distinct categories as follow (1) use of ARAC engineers to provide customized interest profile and retrospective search services, (2) dissemination of Standard Interest Profiles (SIP), (3) use of special librarians (such as in the specialized libraries of universities, e.g., physics, geology, etc.) to organize the information needs of faculty members and then interact with ARAC, and (4) putting faculty members on their own to extract the information they require from ARAC. From information recently gathered, although not recorded, apparently a great deal of the latter has been done by Indiana University faculty. In so far as possible, identical test groups will be used in an effort to evaluate and compare the four routes to the ARAC information warehouse. A complete description of the design of this experiment for 1967 will be available early in 1967.

Small Business Programs

Small Member Companies. During the quarter two additional firms considered to be in the small firm category became active members of

ARAC. These firms are Systems Sciences, Incorporated and Welco Industries. Additional small companies applied for membership, and were accepted, to become active early in the next quarter. At the end of the fourth quarter, the number of member companies considered to be in the small business category now stands at thirteen, or approximately 25% of the total ARAC member companies.

NASA - SBA Small Business Experiment. The number of companies now participating in this experiment stands at seven. One firm, Nuclear Measurements Corporation in Indianapolis, has been essentially dropped from the experiment because of their low activity level (see Appendices A and C last quarterly report). Activity with the other six companies is being maintained at approximately the same level as reported in the last quarterly report (see Appendix A of this report) and the feedback from these companies remains favorable. Particular success has been achieved with Prosthetics, Incorporated of Fort Wayne, Indiana. Prosthetics, Incorporated is a small company which sepcializes in the technology involved for artificial human hearts. Plans are now underway for doing a film on the interaction of Prosthetics, Incorporated with ARAC for use in the 1966 NASA Transfer Film.

Satellite Center Activity. Service activity with business firms through the NASA "satellite" dissemination centers experienced an increase in the number of custom profiles now being processed under this program (increase of five over previous quarter). All of these profiles are concentrated at one satellite center, the University of New Mexico. The average number of retrospective searches processed per month under this activity has decreased somewhat from the previous quarter but seems to fall about on the original growth rate prior to the distortion of the curve by the unusually large number of retrospective searches processed during the third quarter of 1966. ARAC continues to supply other regional dissemination centers with the Industrial Applications Reports abstracts generated here. The reader is referred to the table in Appendix A of this report for a breakdown of activity with each of the four satellites and the quarter-to-quarter change in activity shown in parentheses opposite the totals.

Bunker Ramo Project (NASA-Recon)

This experiment in real-time information retrieval became operational on December 19, 1966. Although operation was intermittent, it remained functional until January 11, 1967, when it was shut down at the central computer in New York. During the twenty-two days of intermittent operation, enthusiasm about the possibilities of this experiment ran extremely high, not only with ARAC engineers but also with the officials of the university and the library heads who were privileged to see it in operation.

We at the Center are particularly disappointed that the experiment was operational for such a short period of time for several reasons.

Firstly, it was felt by the personnel at the Center that the successful operational of the experiment would have been a tremendous asset in our day to day operations with member companies. Secondly, it is estimated that between $5,000 to $10,000 was expended by the Center in terms of man-hours, telephone, space changes, progress reports, etc., toward the success of the experiment. Unfortunately, the experiment was shut down before any valid conclusions could be reached. The Bunker-Ramo equipment is still installed here at the Center and we are quite anxious for the experiment to be reactivated, particularly since the space it occupies is urgently needed for other purposes (e.g., document reproduction equipment) and should not stand idle.

Appendix B of this report contains a letter and a brief report on the RECON SYSTEM and its operation at ARAC. The report in Appendix B was prepared by Mr. Robert Hall, ARAC Assistant Manager of Technical Operations.

Profile Analysis Program

The Profile Analysis Program (PAP) has continued to aid ARAC in keeping the relevancy of the current awareness profiles at an effective and economical level of operation. This subsystem of the overall ARAC current awareness system is firmly established but further refinements will be made in the coming year. An abstract of an article which is in the final stages of preparation may be found in Appendix C of this report. This article will serve as public announcement of the technique and ARAC will be willing to answer any questions which might arise in connection with the Profile Analysis Program.

Although the basic computer program is machine oriented in the sense that it assumes a 48 bit, fixed word length computer as well as a file which is in a specific format there are several aspects which might be of interest to other groups. For this reason ARAC will also be willing to make listings of the program available.

Computer Programs

The Computer Information Service (CIS) has processed requests for some 76 computer programs during the last quarter of 1966. There has been a delay in filling some of these requests due to an inability on the part of the supplier to deliver the programs in a workable fashion.

During this quarter the CIS continued to disseminate, on a monthly basis, 175 copies of the ARAC Standard Interest Profile in the computer area. The development of this new service was essentially completed this year and the service considered "established", and thus entered in ARAC's revised fee schedule effective November 1, 1966. Nevertheless, it is planned that the service will be extended and expanded in the coming year.

Technical Marketing Information Service

This experiment continues to enjoy increasing acceptance and its development was considered completed in 1966. Accordingly the service was entered in ARAC's revised fee schedule effective November 1, 1966. The number of mailing points for this service has grown to 186 throughout the ARAC member companies. During the fourth quarter 935 requests for full reports were filled, up more than 300 requests from the previous quarter.

Industrial Applications Reports

This was an experimental activity in which ARAC technical people generated abstracts of reports from the NASA file which seem to have high industrial application potential. Abstracts of these reports were sent weekly to numerous mailing points along with the NASA Tech Briefs. This experiment gained considerable acceptance in 1966 as evidenced by the continued high rate of requests during the fourth quarter. The development of this service was considered completed in 1966 and it was included in the revised ARAC fee schedule effective November 1, 1966.

Management Science Service

Phase I of a proposed Management Science Service continues with favorable results. On the basis of these results (monitoring twenty-five custom interest profiles in this subject area), work has begun on the development of standard interest profiles. In addition, a plan for the development of an experimental Management Science Service (MSS) is being developed as a proposal for funding in 1967.

It is expected that this new service will be the only new one under development by ARAC in 1967.

Promotion

ARAC promotional activities during the fourth quarter were as listed below. Not included in the list are visits made to member companies and prospective member firms.

October:	University of Arizona-STSA - DWC
	NSF-Chemical Registry Project - JD/AMW/RWC
	HUD-Housing and Development - AMW
	SBA/Argonne (AEC)/NASA Workday - Chicago - HLT
	American Scoiety of Mechanical Engineers, Executive Division Meeting - HLT
November:	University Patents Service - RWC/JD
	Western Electric-NAPE- Engineering Management Project - DWC

National Standards Association - RWC/JD/CWM
Annual ARAC/IEP Company meeting - AMW/Staff

ARAC continues to receive a steady influx of visitors from member companies, prospective member companies, government agencies, and various universities. A selected list of visitors for the fourth quarter 1966 may be found below. Not included in this list are visits from member companies, prospective member companies, and attendees at the annual ARAC fall meeting.

Company	Representative	Date
Urban Development Dept. Washington, D. C.	Mr. Haar	October 11, 1966
Division of Economic & Business Research - University of Arizona	Dr. David Shirley	October 13, 1966
North American Aviation	Mr. Herron	
	Mr. Fox	October 14, 1966
CAST, Detroit, Michigan	Mr. Earl Borset	October 25, 1966
Crysler Corporation	Representative	October 25, 1966
National Science Foundation Washington, D. C.	Mr. Thomas Quigley	October 27, 1966
Fall Meetings		November 2-3, 1966
National Standards Association	Mr. Alexander Grove	November 7, 1966
University Patents	Mr. Joseph Naines	November 10, 1966
George C. Marshall Flight Center	Mr. John Graham	December 8, 1966

Summary for the Year

Completed Projects. This year (1966) saw the successful completion of a number of special projects under this contract, as follows:

1) The Technical Marketing Information Service (MIS)
2) The Computer Information Service (CIS)
3) The Industrial Applications Reports addition to the Industrial Applications Service (IAS)

The ARAC cost system, developed and operated manually in the last half of 1965 and by computer subsequently, enabled ARAC to cost out and separately charge for these services in its revised fee schedule effective November 1, 1966 (see attached copy).

4) The profile analysis program (PAP), shortly to be available to other regional dissemination centers. (See abstract in Appendix C.)
5) The NASA Recon experiment (Bunker-Ramo) completed but with indeterminate results as reported in Appendix B.
6) Appendix D of this report contains the abstract of a doctoral thesis by Melvyn P. Galin entitled "The Management of Scientific

and Technical Information Systems in Industry". This thesis results in the termination of a project partially supported by NASA through ARAC prior to years covered by this report. Multiple copies of the entire thesis are now in print and shall be forwarded to NASA Technology Utilization in early 1967.

Projects Still in Process:

(1) The NASA/SBA experiment--yet to be evaluated (not until one year of service operation with all six companies is completed).

(2) The Universities Program--must be evaluated as only partially successful in that the methods employed during 1966 did not bring forth the hoped-for results. The less than hoped-for results obtained will be used as a basis for further experimentation in 1967.

(3) The Workday program for small businesses--only partially successful in that the five workdays in various cities as reported in prior quarterly reports were not well-attended, even though enthusiastically received by the company people who did attend, and only a few new company memberships can be clearly attributed to this activity. Whether or not this relatively expensive activity will be continued will depend in great part on the availability of funds for the purpose in 1967.

(4) The Satellite Center activity--must be viewed as a successful project in that ARAC interacted successfully with at least three Satellite Centers (University of New Mexico, Southeastern Oklahoma, and Midwest Research Institute).

(5) Phase I of the proposed Management Science Service--completed successfully in that the findings point clearly to the desirability of developing this new service during 1967, which, if successful, will be the sixth service in the ARAC product line, all developed during a five-year period.

(6) Document Reproduction--studies of which were made in 1966 and a report of which was forwarded to NASA as part of a proposal requested by NASA.

(7) Phase I of the SIP Program (Standard Interest Profiles)--initial development of some 30 industrially oriented SIP's is underway. This effort will be expanded via Contract Number II extension during 1967.

APPENDIX A

Breakdown of Activity Under Special

Projects Contract for Fourth Quarter 1966

	Number Retro-spective Searches	Selective Dissemination Service - No. of Profiles	Industrial Applications Service - No. of Reports Requested	Marketing Information Service - No. of Documents Requested	Documents Requested	Computer Information Service - No. of Programs Requested
Satellites						
University of New Mexico	29	68	12	11	2	-
Midwest Research Institute	76	-	1	-	-	1
Southeast Oklahoma State	10	-	2	-	17	-
University of Maryland	-	-	-	-	-	-
Other	1	1	-	-	-	1
Sub Total	116 (60↓)	69 (16↑)	15 (10↓)	11 (9↑)	19	2
Universities						
Purdue	1	1	-	-	12	-
Wisconsin	2	-	-	-	1	-
Ohio State	2	-	-	-	-	-
Indiana	3	3	-	67	49	-
Notre Dame	-	1	-	-	13	-
Kentucky	-	-	-	-	-	1
Connecticut	1	-	-	-	-	-
Wayne State	-	-	-	-	5	-
Sub Total	9 (6↓)	5 (2↑)	- (↔)	67 (62↑)	80	1
SBA Companies						
Barnes & Reinecke, Inc.	-	1	41	30	33	-
Nuclear Measurements Co.	-	-	-	-	-	-
Ordnance Engineering Asso.	2	-	16	-	18	-
Pollak & Scan, Inc.	1	-	36	21	5	-
Regency Electronics	-	1	9	-	42	-
Texscan Corporation	-	-	24	11	-	-
Prosthetics, Inc.	5	2	31	-	88	-
Sub Total	8 (10↓)	4 (↔)	157 (136↓)	62 (35↑)	186	-
Totals	133 (76↓)	78 (18↑)	172 (146↓)	140 (106↑)	285	3

APPENDIX C

Abstract of a Paper in Preparation on the

ARAC Profile Analysis Program

A Computer Aid for the Analysis and Maintenance of Current Awareness Profiles

In operating a "Current Awareness Service" or Selective Dissemination Service (SDS), as it is referred to at the Aerospace Research Applications Center (ARAC), one of the outstanding problems is maintaining the efficiency of the Current Awareness Profiles. The cost and effectiveness of the entire service can be ultimately traced to the performance of the profiles. For this reason it bacame necessary in the course of operating the ARAC SDS system to develop a computer tool to analyze current awareness profiles.

Approximately one year of continuous use of this tool is now available from which to draw conclusions. The general results which have been obtained are discussed as well as the explicit details of operation of this computer tool.

APPENDIX D

Abstract of a Doctoral Thesis by

Mr. Melvyn P. Galin

TO: Dr. Howard L. Timms
FROM: Melvyn P. Galin

ABSTRACT

THE MANAGEMENT OF SCIENTIFIC AND TECHNICAL INFORMATION SYSTEMS IN INDUSTRY

The creation of formally organized scientific and technical information (STINFO) systems in industry is a relatively recent occurrence. Very little information has been reported concerning the management of such systems and the relationships between their STINFO problems and the decisions and methods applied by company management in dealing with them.

It is the basic hypothesis of this investigation that the management of industrial STINFO systems is systematically related to the external STINFO environment faced by the company and to certain variables internal to the company through the effects of these variables on the operating functions of the company's STINFO system. To investigate this contention the pertinent literature was searched and in-depth, on site field research interviews were conducted in selected companies. Information concerning external and internal variables affecting STINFO systems, operating functions of STINFO systems and management factors related to STINFO systems was collected, interpreted and analyzed and is reported in this study. In addition, an outline of the operating characteristics of industrial STINFO systems at various levels of development or sophistication is presented.

The results of this research confirm the basic hypothesis and show that STINFO systems are subject to most of

the administrative factors which apply to business in general, and that the same basic concepts and principles apply to their management. It also appears that specific patterns of management relate to STINFO systems at different levels of development and that those systems which are in an intermediate phase of development have more pressing management problems than do many systems at either relatively low or high levels of operating sophistication.

Several areas for further profitable research are also suggested.

FEE SCHEDULE

Aerospace Research Applications Center
Indiana University Foundation
Bloomington, Indiana

Services priced below are explained in the ARAC Operating Manual.

I. Basic annual subscription fee applicable to all companies, and covering the following: $150.00

1) Weekly Industrial Applications Abstract Service (approximately 10 items/week to one company mailing point--see II (a) below for additional charges)

2) Conference fees including:
   a) Annual ARAC and Indiana Executive Program Meetings
   b) New Technology Workdays
   c) Weekly Science Meetings
   d) Annual School of Business Alumni Meeting

3) Subscription to:
   a) NASA Scientific and Technical Aerospace Reports (STAR)
   b) International Aerospace Abstracts (IAA)
   c) Business Horizons
   d) Indiana Business Review
   e) Miscellaneous Special Publications

4) Liaison Service in:
   a) Enrollment in Indiana Executive Program
   b) University Records and Admissions, Special Events, and Accommodations
   c) Science faculty consulting arrangements
   d) Management faculty consulting arrangements
   e) Special information and document sources

II. Annual fee for all other services at unit prices as follows:

a) Weekly Industrial Applications Service, per copy per mailing point (over and above I (1) above), abstracts only 50.00
   Full copy of Industrial Applications Reports, each $1.85
b) Monthly Marketing Information Service, per copy per mailing point, abstracts only 80.00
   Full copy of Marketing Reports, each $1.85
c) Monthly Computer Information Service (Reports included) 60.00
   Computer program charge (deck or tape copy), each $14.00
d) Twice-monthly Selective Dissemination Service, per Standard Interest Profile (one abstract copy to one mailing point, reports included) 80.00
e) Twice-monthly Selective Dissemination Service, per Custom Interest Profile (one abstract copy to one mailing point, reports included), unit price in accordance with average profile activity as follows:

Average No. of Reports Identified	Unit Price/Profile (annual)
1 - 25	$195.00
26 - 50	295.00
51 - 75	495.00
76 - 100	695.00
101 - 125	895.00

f) Multiple abstract mailings from (e) above, each copy/year. . . . 25.00

III. Services provided on an "as required" basis:

a) Retrospective Search (reports included), each 70.00

IV. Fees are payable in three installments:

a) At start of service year - ½ of planned annual service costs, minimum of $150.00 (basic subscription fee).
b) At midyear - ½ of revised planned annual service costs.
c) At year-end - remainder of annual service cost based upon actual services used during year.

Revised, October, 1966